C I T Y OF S A N A N T O N I O

P O BOX 839966
SAN ANTONIO, TX 78283-3966

Storm Water Review Team
REVIEW COMMENTS

Date: Project: Plat / Permit ID: Engineer of Record: Design Firm:	 SWE ID: REVIEWER: QA/QC: Team Leader: Robert Browning, PE (207-5890)
Parent MASTER DEVELOPMENT PLAN: (for major or minor plat submittals, if applicable)	_____

REVIEW TYPE:

☐ I Major Plat ☐ I - Minor Plat ☐ II - MDP/PUD ☐ III – Floodplain, CLOMR/LOMR

☐ IV - Building Permit ☐ V – Storm Water Management Plan

	Staff Use Only			
	Provided	Complete	Incomplete	Comments
I - MAJOR/MINOR PLAT				
Introduction & Project Description				
Project Location Map				
Flood Insurance Rate Map				
Aerial Map				
Check Maps for Mandatory detention areas				
Verify if property is next to a flood plain. If next to a flood plain, Report should include the impact on the Floodplain's Q & WSEL Due to the increase of runoff.				
A grading plan showing the direction of flow of the streets and lots should be provided. Carefully review the grading plan to make sure the lots are draining properly in accordance with the FHA lot grading types A, B, &C. (35-504(E)(2) p 5-40)				
The increased runoff resulting from proposed development will not produce a significant adverse impact to other properties, habitable structures or drainage systems to a point 2000' feet downstream therefore the owner request to participate in the Regional Storm Water Management Program by paying a fee in lieu of detention". (Does not apply to detention)				
A) Onsite Hydrology				
Existing & Proposed Drainage Area Map				

	Provided	Complete	Incomplete	Comments
Existing & Proposed - 5, 25 and 100yr				
Increase in Runoff				
Rational Method < than 640 Acres				
SCS Method > than 640 Acres				
HEC-1, HMS, Pond Pack & Hydro Flow				
Detailed Calculation of Hydrology				
Time of Concentration				
Overland, Sheet & Channel				
Overland – 5 minutes min or 20 minutes max				
Channel flow not less than 6 fps				
Verify Rainfall Intensities				
Verify Runoff Coefficient				
CN – Value				
Impervious Cover				
B) Onsite Hydraulics				
Street plans				
Capacity within top of Curb (5yr for local and others are 25yr)				
Capacity within Right of Way				
Min & Max slope on Cul-de-sac for Curb opening				
Minimum Slope away from dead end street				
Drainage plans				
Check Curb inlet Openings Calculation				
Curb Inlets Q25				
Check Storm Sewer for HGL & EGL & Calculation				
HGL must be below gutter				
EGL must be below top of curb or Junction box				
Junction box				
Minimum easement required (15ft) or 6ft from Extreme limits of pipe				
Check Junction Box Detail				
Pipe Bedding and Backfill Details *(See special detail)*				
Note on 2nd layer (Rocks not larger than 1")				
Check Junction box size for min of 6"(0.5) from O.D. of pipe no less				
Provide conc. Collars when using C.M.P. or H.D.P.E. Pipes. (Provide 50 yr warranty letter)				
Details Make sure grout is added to spring line				
Weep Holes are required in Rip Rap on Headwalls 5ft and higher And are to be placed 6" above the toe and also 10ft apart. Geo-fabric is to be placed behind the riprap to hold the gravel (1cubic feet).				
Drainage structures sized properly for the Q				
Channels Q25 plus 6" freeboard (calculations in report or plans)				
Check channel velocities: under 6fps for earthen				
Use Energy Dissipaters for velocities greater than 6fps				
Check if access road easement is required				
Interceptor drainage easements shall extend a minimum of two (2) feet on both sides of the extreme limits of the channel. Refer to Figure 504-4. (35-504 P5-52)(H)(8) (D)				
Check Standard detail sheets				
C) Notes required				
Earthen channel				
Improved earthen channels and detention ponds will be vegetated by seeding or sodding. Eighty five percent of the channel surface area must have established vegetation before the City of San Antonio will accept the channel for maintenance. (35-504 P5-52)(H)(8) (E)				
All concrete channels and linings				
All concrete lining shall develop a minimum compressive strength of				

	Provided	Complete	Incomplete	Comments
not less than 3,000 psi in 28 days.				
D) Other Items to check				
For normal conditions, the concrete lining shall be a minimum of five (5) inches thick and reinforced with **No. 3 round bars @ 12 inches on center each way.** Where surcharge, nature of ground, height and steepness of slope, etc. become critical, design shall be in accordance with latest structural standards. All concrete lining shall develop a minimum compressive strength of not less than three thousand (3,000) pounds per square inch in twenty-eight (28) days. The depth of all toe downs shall be 36 inches upstream, 24 inches downstream, and 18 inches for side slopes. The City's Construction Inspector may permit an 18" toe down in rock subgrade in lieu of the above toe down requirements. The horizontal dimensions of toe downs shall not be less than six (6) inches. (35-504 (h)(7)(a) p 5-55				
No more than two average residential lots draining to another lot or 200'				
Check for interceptor drains				
Check that channel converges with downstream channels				
Utility Layout				
Tie-in's from properties to Storm Sewer Systems				
E) Plats - Plan Requirements				
Finished Contours (Page B-39 Appendix B Under # 5 Subdivision Plat (B)				
Easements (Page B-39 Appendix B Under # 5 Subdivision Plat)				
Continuation of Streets & Channels Note: Easement to expire upon incorporation into platted public street right-of –way (p 5-114 35-501(F)(1)				
NOTE: NO STRUCTURE, FENCES WALLS, OR OTHER OBSTRUCTIONS THAT IMPEDE DRAINAGE SHALL BE PLACED WITHIN THE LIMITS OF THE DRAINAGE EASEMENTS SHOWN ON THIS PLAT. NO LANDSCAPING OR OTHER TYPE OF MODIFICATIONS, WHICH ALTER THE CROSS-SECTIONS OF THE DRAINAGE EASEMENTS, AS APPROVED, SHALL BE ALLOWED WITHOUT THE APPROVAL OF THE DIRECTOR OF PUBLIC WORKS. THE CITY OF SAN ANTONIO AND BEXAR COUNTY SHALL HAVE THE RIGHT OF INGRESS AND EGRESS OVER GRANTOR'S ADJACENT PROPERTY TO REMOVE ANY IMPEDING OBSTRUCTIONS PLACED WITHIN THE LIMITS OF SAID DRAINAGE EASEMENTS AND TO MAKE ANY MODIFICATIONS OR IMPROVEMENTS WITHIN SAID DRAINAGE EASEMENTS. (Combined note from 35-504 (to add statement p-5-39 (d) (5), (h) (1) p-5-48 and 35-505 (g) (1) p-5-59.				
NOTE: FINISHED FLOOR ELEVATIONS MUST BE A MINIMUM OF (8) INCHES ABOVE FINAL ADJACENT GRADE. (35-504(E)(2) p 5-40) (If in floodplain need flood plain note with finished slab elevation a minimum of one foot above BFE.)				
NOTE: MINIMUM FINISHED FLOOR ELEVATIONS FOR RESIDENTIAL AND COMMERCIAL LOTS SHALL BE ELEVATED AT LEAST 1 FOOT HIGHER THAN THE COMPUTED WATER SURFACE ELEVATION FOR THE 100 YEAR ULTIMATE DEVELOPMENT. (35-505(k)(2)(3) (p-5-60)				
F) Adverse Impact Analysis (See section V of this checklist)				
If MDP provided an Adverse Impact Analysis then it is not required during platting process				
Items to Check				
Proposed Development to 2000 feet downstream				
Check Existing, Proposed and Ultimate Condition for 5, 25 &				

	Provided	Complete	Incomplete	Comments
100-yr (proposed is optional)				
What is the effect of the runoff on the neighboring property				
Are offsite calculations for existing street capacity, curb inlets, Storm Sewer and channel provided				
G) Offsite Hydrology				
Drainage Area Map				
Existing, Proposed & Ultimate - 5, 25 and 100yr				
Rational Method < than 640 Acres				
SCS Method > than 640 Acres				
HEC-1, HMS, Pond Pack & Hydro Flow				
Detailed Calculation of Hydrology				
Time of Concentration				
Overland, Sheet & Channel				
Overland – 5 minutes min or 20 minutes max				
Channel flow not less than 6 fps				
Verify Rainfall Intensities				
Verify Runoff Coefficient				
CN – Value				
Impervious Cover				
H) Offsite Hydraulics				
Street				
Capacity within top of Curb (5yr for local and others are 25yr)				
Capacity within Right of Way				
Drainage				
Check Curb inlet Openings Calculation				
Curb Inlets Q25				
Check Storm Sewer for HGL & EGL & Calculation				
HGL must be below gutter				
EGL must be below top of curb or Junction box				
Drainage structures sized properly for the Q				
I) Check Storm Water Management Plan (See section V of this check list)				

II - MDP/PUD				
Introduction & Project Description				
Project Location Map				
Flood Insurance Rate Map				
Aerial Map				
Drainage Area Map				
A) Onsite Hydrology				
Existing & Proposed Drainage Area Map				
Existing & Proposed - 5, 25 and 100yr				
Increase in Runoff				
Rational Method < than 640 Acres				
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Curb Inlets Q25				
Check Storm Sewer for HGL & EGL & Calculation				
HGL must be below gutter				
EGL must be below top of curb or Junction box				
Drainage structures sized properly for the Q				
D) On-site or Regional Storm Water Facility Provided.				
Preliminary discharge calculations and hydraulics calculations specifying methodology, assumptions and values of design parameters				
Preliminary detention volume calculation				
Location on detention pond on the MDP				
E) FEMA Floodplain adjacent to MDP				
See **Floodplain Checklist Appendix B-106** for items required or				

provide Note: "The Floodplain limits on this Master Development Plan are estimated and subject to change. Approval of subdivision plats associated with this Master Development Plan is subject to the review and approval of a Storm Water Management Plan in accordance with Appendix B, Section 35-B119 of the City of San Antonio Unified Development Code."				
Note must be signed by Engineer and Owner				
F) Plans				
MDP plan (No drainage study) needs to show topography, proposed property, drainage easement or ROW, current FEMA floodplain (from FIRM panel), and calculated 100-year ultimate floodplain (if applicable, see item II.E).				
G) Check Storm Water Management Plan (See section V of this check list)				

III – FLOODPLAIN, CLOMR/LOMR (floodplain checklist from UDC Appendix B)				
1. Vicinity Map				
2. Location of property on current flood insurance Rate Map				
3. U.S.G.S. Quadrangle maps showing overall drainage areas, runoff coefficients, times of concentration, and intensity.				
4. Note on subdivision plat: *"No Construction, Improvements, or Structures are allowed within 100-year floodplains or drainage easements shown hereon."*				
5. Drainage easement(s) dedicated based on the higher of the 25-year ultimate development plus required freeboard or the 100-year ultimate development conditions water surface elevation.				
6. Plan view of project limits showing cross sections, existing / proposed topography, proposed development, and existng and ultimate development floodplains.				
7. Channel cross sections (proposed superimposed on existing) on 24"x36" plan sheet. Show drainage easement (and/or property) limits, Manning's friction factors, structures, etc.				
8. Hydrology. Include details of: a. Times of concentration and lag time calculations. b. CN values (SCS Curve number). Include amount in each hydrologic soil group in acres. c. Soil Survey for the CN value by soil type. d. Percent impervious cover for existing, post-development, and ultimate development conditions. e. Drainage areas (include pre-, post- and ultimate development maps as applicable). f. Other maps as necessary to support calculations. g. Runoff discharge calculations.				
9. 25-year ultimate development plus required freeboard condition hydrologic and hydraulic analysis (hard-copy + electronic, see below)				
10. 100-year existing and ultimate development condition hydrologic and hydraulic analyses (hard copy + electronic, see below).				
11. 10, 50, 100, and 500 year analyses for map revision detail study areas.				
12. Electronic copies of all hydrologic and hydraulic models used in analyses.				
13. Is the development over the Edwards Aquifer Recharge Zone?				
14. Floodplain Development Permit Application				
15. Plotted water surface profiles for items 9, 10, and 11 (as applicable)				
16. Grading Plan (with existing and proposed finished contours.				
17. Revised (as calculated in hydraulic analysis) floodplain limits on a current flood insurance rate map. Tie-in to current floodplain at upstream and downstream limits).				
18. Elevation Certificates as applicable.				
19. Complete FEMA Formwork for CLOMRs and LOMRs.				
20. Narrative (UDC section 35-B119(d)) Include: a. Table of Contents b. Abstract or executive summary. c. Introduction that includes project description and history, location, scope and objective of analysis. d. Summary, conclusions, and recommendations. Discuss water surface elevation changes and impacts.				

IV - Building Permit				
Storm water Participation Form				
A) Increase of Impervious Cover < 4,300 s.q. f.t.				
Location map on U.S.G.S.				
Grading/Site Plan				
Existing & proposed contours				
Building Layout, Parking, Sidewalks, Patios, & etc.				
Storm Water Discharge Points				
Minimum Fee $300.00				
B) Increase of Impervious Cover > 4,300 s.q. f.t				
Location map on U.S.G.S.				
Grading/Site Plan				
Existing & proposed contours				
Building Layout, Parking, Sidewalks, Patios, & etc.				
Storm Water Discharge Points				
C) Onsite Hydrology				
Existing & Proposed Drainage Area Map				
Existing & Proposed - 5, 25 and 100yr				
Increase in Runoff				
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Verify Runoff Coefficient				
CN – Value				
Impervious Cover				
D) Adverse Impact Analysis				
1) Items to Check				
Proposed Development to 2000' feet downstream				
Check Existing, Proposed and Ultimate Condition for 5, 25 & 100-yr (proposed is optional)				
Impact of the runoff on the neighboring property.				
Are offsite calculations for existing street capacity, curb inlets, Storm Sewer and channel provided				
2) Offsite Hydrology				
Drainage Area Map				
Existing, Proposed & Ultimate - 5, 25 and 100yr				
Rational Method < than 640 Acres				
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Curb Inlets Q25				
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Drainage structures sized properly for the Q				
E) Check Storm Water Management Plan (See section V of this checklist)				
V - Storm Water Management Plan For Adverse impact Analysis and Mitigation Proposals				
A) Detention checklist				
Watershed size				
Type of existing development ~ C or CN				
New development – increase in impervious cover				
Time of Concentration ~ Existing and Improved				
Inflow Hydrographs for 5, 25, and 100 year storms				
Required storage based on 5, 25, and 100 year storms				
Depth / storage table				
Pond height above ground ~ needs to be 6 feet or less				
Depth and Outflow Table base on Outlet Structure				
Backwater maybe a facture if discharging into an existing channel				
Route the inflow through the pond structure				
Routing curve for 5, 25, and 100 year storms				
Pond grading Reflected on the subdivision plat				
Maintenance Agreement				
Site grading Plan				
Provide Pond X Sections and Details				
Provide a private drainage easement around detention pond on plat				
Ponds above 6 feet must be approved by TNRCC				
Post development discharge must be less than or equal to predevelopment discharge for 5, 25, and 100 year storms frequencies.				
For watersheds less than 20 Acres use modified rational method or Rational Method. Provide 2 copies of the detention pond construction plans sign and sealed by engineer on 24”x 36” sheets.				
B) Adverse Impact Analysis				
If MDP provided an Adverse Impact Analysis then it is not required during platting process				
1) Items to Check				
Proposed Development to 2000’ feet downstream				
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Drainage structures sized properly for the Q				
C) Storm Water Participation Form				
Verify Property Acreage of Participation				
Storm Water Fee				
Residential $750.00 /Lot				
Residential $1,200/Acre				
Multifamily $1,600/Acre				
Non Res.< 65% Imp $2,600.00 /Acre				
Non Res.> 65% Imp $2,600.00 /Acre				
D) Note required on the Plat				
Detention Pond or Water Quality Basin Note:				
NOTE: THE MAINTENACE OF THE DETENTION POND (Water Quality Basin) and OUTLET STRUCTURE (THOSE IMPROVEMENTS WITHIN THE DETENTION BASIN ESM'T. OR PRIVATE EASEMENT SHALL BE THE RESPONSIBILTY OF THE LOT OWNERS OR HOME OWNERS ASSOCIATION THEIR SUCCESSORS OR ASSIGNS AND NOT THE RESPONSIBILITY OF THE CITY OF SAN ANTONIO AND OR BEXAR COUNTY.				